HD
1761
C6
#85

University of California
College of Agriculture
Agricultural Experiment Station
Berkeley, California

COST OF DRYING CUT FRUIT IN CALIFORNIA

by

Alexander Joss

September, 1943

Giannini Foundation of Agricultural Economics
Mimeographed Report No. 85

UNIVERSITY OF CALIFORNIA
LIBRARY
COLLEGE OF AGRICULTURE
DAVIS

LIST OF TABLES

Page

Table 1. Number of records obtained of the cost of drying apricots, apples, peaches, and pears, selected areas, California, 1942 3

Table 2. Comparison of tonnage of fruit dried by operators who cooperated in the study with tonnage dried in California, 1942 3

Table 3. Apricots: Summary of dry-yard costs per fresh ton and per dried hundredweight, fifty-eight dry-yards, California, 1942 7

Table 4. Apricots: Distribution of fifty-eight dry-yards with respect to their total drying costs per fresh ton of fruit dried, selected areas, California, 1942 9

Table 5. Apricots: Distribution of fifty-eight dry-yards with respect to their labor costs per fresh ton of fruit dried, selected areas, California, 1942 9

Table 6. Freestone peaches: Summary of dry-yard costs per fresh ton and per dried hundredweight, forty dry-yards, selected areas, California, 1942 11

Table 7. Freestone peaches: Distribution of forty dry-yards with respect to their total drying costs per fresh ton of fruit dried, selected areas, California, 1942 12

Table 8. Freestone peaches: Distribution of forty dry-yards with respect to their labor costs per fresh ton of fruit dried, selected areas, California, 1942. 12

Table 9. Clingstone peaches: Summary of dry-yard costs per fresh ton and per dried hundredweight, fourteen dry-yards, Stanislaus County, California, 1942 14

Table 10. Clingstone peaches: Distribution of fourteen dry-yards with respect to their total drying costs per fresh ton of fruit dried, Stanislaus County, California, 1942 15

Table 11. Clingstone peaches: Distribution of fourteen dry-yards with respect to their labor costs per fresh ton of fruit dried, Stanislaus County, California, 1942 15

Table 12. Pears: Summary of dry-yard costs per fresh ton and per dried hundredweight, four dry-yards, California, 1942 16

Table 13. Gravenstein apples: Summary of drying costs per fresh ton and per dried ton, six driers, Sebastopol area, California, 1942 . . . 17

Table 14. Late apples: Summary of drying costs per fresh ton and per dried ton, four driers, Sebastopol area, California, 1942 20

Table 15. Late apples: Summary of drying costs per fresh ton and per dried ton, five driers, Watsonville area, California, 1942 20

Page

Table 16. Comparison of rental charges with depreciation and interest on investment, 11 selected apple driers, Sebastopol and Watsonville areas, California, 1942 21

Table 17. Tonnage of apricots dried, by varieties, selected areas, California, 1942 22

Table 18. Tonnage of freestone peaches dried, by varieties, selected areas, California, 1942 22

Table 19. Analysis of variance of drying ratios of apricots, by varieties, California, 1942 23

Table 20. Analysis of variance of drying ratios of freestone peaches, by varieties, California, 1942 23

Table 21. Tonnage of all fruit dried, 81 dry-yards, selected areas, California, 1942 24

Table 22. Average investment in drying facilities per fresh ton of fruit dried, 80 dry-yards, selected areas, California, 1942 24

Table 23. Average investment in drying facilities per fresh ton of fruit dried, by size of dry-yard, 1942 27

Table 24. Average tonnage of fruit dried per dry-yard, 81 dry-yards, selected areas, California, 1942 27

Table 25. Operator's estimates of the length of life of drying equipment, 81 dry-yards, selected areas, California, 1942 28

Table 26. Relation of size of tray to original cost and length of life, 80 dry-yards, selected areas, California, 1942 28

Table 27. Hours of shed, yard, and supervisory labor at different wage rates, apricots, selected areas, California, 1942 29

Table 28. Hours of shed, yard, and supervisory labor at different wage rates, freestone peaches, selected areas, California, 1942 . . . 30

Table 29. Boxes of apricots cut at different rates of pay, selected areas, California, 1942 31

Table 30. Boxes of peaches cut at different rates of pay, selected areas, California, 1942 31

Table 31. Average wage rates for different kinds of work, 6 selected driers, Sebastopol and Watsonville areas, California, 1942 . . . 33

Table 32. Hours of labor required per fresh ton for drying apricots and peaches, selected areas, California, 1942 33

Table 33. Labor requirements for drying pears, selected areas, California, 1942 34

Table 34. Hours of labor required to dry apples, selected driers, Sebastopol and Watsonville areas, California, 1942 34

Page

Table 35. Number of boxes of Bartlett pears cut per hour and amounts earned by 89 cutters during the week ending September 26, 1942, Lake County, California 36

Table 36. Tray equipment, 84 dry-yards, selected areas, California, 1942 . . 36

Table 37. Pounds of fruit per tray reported by 81 dry-yard operators, selected areas, California, 1942 37

Table 38. Calculated tray capacity in relation to tonnage of apricots dried, 81 dry-yards, selected areas, California, 1942 37

Table 39. Calculated tray capacity in relation to tonnage of freestone peaches dried, 81 dry-yards, selected areas, California, 1942 . . 39

Table 40. Utilization of apricots and peaches on farms included in study, selected areas, California, 1942 40

Table 41. Sulfur used per ton of apricots and peaches, 81 dry-yards, selected areas, California, 1942 40

COST OF DRYING CUT FRUIT IN CALIFORNIA 1/

by Alexander Joss 2/

SUMMARY

This study presents data obtained from operators of 84 dry-yards and 11 apple driers during the 1942 drying season. These men furnished information on the cost of drying a total of 3,915 tons of apricots, 8,197 tons of freestone peaches, 1,377 tons of clingstone peaches, 2,691 tons of pears, and 16, 693 tons of apples. All weights are given on a fresh basis.

It cost an average of $22.96 per fresh ton to dry apricots during the 1942 season. An average of 5.44 pounds of fresh fruit were required to produce one pound of dried fruit. The average cost of drying per dry pound was therefore 6¼ cents. Labor was the most important item of cost, amounting to about 77 per cent of the total.

Freestone peaches cost an average of $13.21 per fresh ton. The freestone peaches dried away at a ratio of 6.69 to 1, resulting in a drying cost of 4.42 cents per dry pound. Again, labor was the most important single item of cost, averaging about three fourths of the total.

Clingstone peaches cost more to dry than freestone varieties mainly because of higher cutting costs. The average cost in 14 dry-yards was $17.41 per fresh ton or 6.34 cents a dry pound. It required an average of 7.29 fresh tons to produce one dried ton.

The apple and pear drying industry is concentrated in the hands of relatively few firms. Although records of apple-drying costs were obtained from only 11 driers, the tonnage of dried apples covered by these records represented 36 per cent of this product produced in California in 1942. Similarly, records were obtained from only four concerns that dried pears, but their combined tonnage of dried fruit represented about 16 per cent of the pears dried in the State in 1942.

Four driers in Sonoma County reported an average cost of only $82.48 per ton of dried apples. This low cost was possible only because the drying ratio was extremely low. Because of the very high quality of the fruit handled by these four driers, only 6.67 tons of fresh apples were required to produce one ton of dried apples.

1/ The author wishes to acknowledge the help received during the course of this study from the following members of the Extension Service of the University of California: B. B. Burlingame, A. G. Volz, Peter T. Meyers, C. C. Barnum, H. R. Keller, N. W. Stice, R. D. McCallum, Henry L. Washburn, V. W. DeTar, Enoch Torpen, A. D. Rizzi, and J. L. Quail.

2/ Instructor in Agricultural Economics, Junior Agricultural Economist in the Experiment Station and Junior Agricultural Economist on the Giannini Foundation.

The cost of drying Gravenstein apples in Sonoma County averaged $103.96 per dry ton, with a drying ratio of 8.23 to 1. Costs were highest in the Watsonville area where they averaged $114.68 per ton of dried apples with a drying ratio of 8.09 to 1.

The average cost for drying a ton of fresh pears was $25.30. The drying ratio was 5.20 to 1, resulting in a cost per one hundred pounds of dried fruit of $6.57. Labor was the biggest single item of expense accounting for slightly more than 70 per cent of the total cost.

The important factors affecting the cost of drying appear to be the ratio of fresh to dried fruit, the efficiency with which labor is used, the wage rate paid, and the average investment per ton. For apricots, the Tilton variety had the highest drying ratio, 6.35 pounds of fresh fruit per pound of dried fruit, compared with only 5.38 pounds for the Royal variety. Of the four freestone peach varieties dried, Elbertas dried away the most, 7.06 to 1, and Lovells the least, 6.44 to 1.

A variation of over 10 cents an hour was found in the wage rates paid hired labor for the shed, yard and supervisory work among the areas studied. The average wage rate was lowest ($0.51 an hour) in San Benito and highest ($0.63 an hour) in Santa Clara County. The wage rate paid hired workers in the Fresno area averaged $0.53 an hour, as compared with $0.62 an hour in Stanislaus County.

The average investment per ton of fruit dried affects both depreciation and interest costs. The average investment per ton was lowest in Stanislaus County ($7.76 per fresh ton) and highest in Alameda County ($46.90 per fresh ton).

Any plan that contemplates the drying of a larger tonnage of apricots and freestone peaches than was dried in 1942, must take into consideration the labor, equipment, and material requirements of the task. Approximately 50 hours of labor are required per ton of fresh apricots, 21 hours per ton of fresh freestone peaches, and 29 hours per ton of clingstone peaches. Within each producing area, much of this labor is needed during a relatively short period.

If any equipment shortage occurs, it seems likely to be an insufficient number of trays. Estimates were made of the tray capacity of the dry-yards studied, and the porportion of this capacity that was used in 1942 was calculated. These calculations are intended as a guide in approximating the tonnage that can be dried within the various areas studies.

Method of Study

Before the 1942 drying season started, a number of dry-yard operators in each of the principal producing areas were contacted and their promise of cooperation obtained. With each was left a work sheet on which the cost data for the season could be entered. When the season was completed, these work sheets were collected and the data analyzed. At the time the work sheets were collected, a supplementary questionnaire was filled out. This furnished information on the acreage, production and use of certain fruit crops, the source of the fruit dried during 1942, and certain data about the dry-yard and the practices followed.

Records were obtained from the operators of 84 dry-yards and 11 apple driers. Because some of them furnished data on more than one crop, 127 individual cost records were obtained (table 1).

TABLE 1

Number of Records Obtained of the Cost of Drying Apricots, Apples, Peaches, and Pears, Selected Areas, California, 1942

County	Dry-yards reporting	Dry-yards furnishing data on				
		Apricots	Apples	Freestone peaches	Clingstone peaches	Pears
Alameda	4	4	--	--	--	1
Santa Clara	18	18	--	--	--	--
San Benito	6	6	--	--	--	--
Solano	12	12	--	2	--	--
Contra Costa	4	4	--	1	--	--
Stanislaus	26	14	--	26	14	--
Fresno	6	--	--	6	--	--
Kings	2	--	--	2	--	--
Tulare	3	--	--	3	--	--
Lake	3	--	--		--	3
Sonoma	6	--	6	--	--	--
Santa Cruz	5	--	5	--	--	--
Total	95	58	11	40	14	4

TABLE 2

Comparison of Tonnage of Fruit Dried by Operators who Cooperated in the Study with Tonnage Dried in California, 1942

Crop	Dry-yards in study	Fresh weight of fruit dried*		California dried fruit production, 1942/	Proportion of estimated State production in study
		Total	Per dry-yard		
	Number	Tons	Tons	Tons	Per cent
Apricots	58	3,915	68	110,000	3.6
Apples	11	16,693	1,518	46,000	36.3
Freestone peaches	40	8,197	205	110,000	7.5
Clingstone peaches	14	1,377	98	22,500	6.1
Pears	4	2,691	673	16,500	16.3

* Fresh weight of fruit dried for which data on costs are available.

/ Preliminary estimates converted to fresh equivalent weights.

No attempt was made to obtain a predetermined number of cooperators or a given tonnage of fruit. The author was guided by the time limits for soliciting cooperators and the number of possible cooperators in a given area. Because of the work involved in keeping the cost records, naturally there were operators who did not care to cooperate. Some indication as to the representativeness of the sample is given in table 2. The large tonnage of apples was obtained primarily because the apple drying in the state is concentrated in two areas and in the hands of relatively few operators. On the other hand, to have obtained a larger number of pear dry-yards or a greater tonnage of apricots in the study would have necessitated considerable travel in the different pear and apricot-producing districts of the State and the soliciting of the operators of a number of very small dry-yards.

Definition of Terms

In any study of costs it is necessary to classify the many individual cost items in such a manner that they may readily be compared. To clarify the tabular material which follows, it is appropriate now to describe the procedure used in this study.

In all instances where the operator or members of his family performed any of the work connected with drying, that labor was included as a cost. The operators frequently valued their time at a slightly higher rate per hour than their regular hired help was receiving in order to reflect the operators' greater skill and ability as workers and managers.

It was possible to use the same classification of costs in the apricot and peach records. The first item shown in this classification is labor, and it is further divided into four categories. Maintenance and repair labor includes the work of getting the dry-yard ready for use, in repairing trays, boxes, and other equipment, and in storing equipment after the drying season is over. Where equipment was used for the drying of more than one crop, the cost of the maintenance and repair labor was allocated among the crops dried on the basis of their respective fresh tonnages. This principle was followed in the allocation of all joint costs. It was impossible to determine for individual dry-yards whether the repair work, particularly that on trays, was of such a nature as to apply to more than one year or not. The repair work that was done was charged as an annual expense. Some operators did comparatively little repair; others did a lot. It is felt that the average for all the yards is a fair representation of the annual repair cost under the wage conditions prevailing in 1942.

Washing trays and boxes labor included also sweeping of trays, since a few dry-yards reported trays were swept rather than washed. One dry-yard used paper tray-liners and had no labor cost of cleaning trays, although this operator felt that the net result of the use of paper was an increase in his costs. Only three dry-yards neither swept nor washed their trays in preparation for the 1942 season.

Cutting labor was a piece-work operation in all yards. When a member of the operator's family cut fruit, the number of boxes cut was recorded and charged at the same rate as was paid the hired cutters. Occasionally, transportation was regularly furnished the cutters, or they were paid an additional sum each day for providing their own transportation. These costs to the operator were added to his regular cutting costs. In one small dry-yard, the shed workers helped with the cutting when they were not busy with their other duties. The number of boxes they cut was charged at the rate paid the other cutters and the amount deducted from the cost of the shed labor.

Shed, yard, and supervisory labor includes the remaining work on the fruit not covered in the first three categories. A separation of these costs was obtained in some yards but not in others due to the fact that workers were shifted at frequent intervals from one job to another.

Material costs need little definition. Repair material is subject to the same comment as repair labor. Some operators used a fairly large amount; others very little. Sulfur costs represent current consumption for the season regardless of the year in which purchased. Cards, knives, and miscellaneous material was a minor expense item in most yards. Some operators required the cutters to furnish their own knives while others provided them.

Other cash costs include the use of spray rigs for washing trays, tractors for preparing the dry-yards, and trucks for hauling trays. Taxes were calculated by multiplying the assessed value of land and equipment by the county tax rate. If irrigation district taxes were levied against the dry-yard, their cost was also included. To this was added, in the case of the commercial yards, the license tax required of them.

Compensation insurance costs were obtained by multiplying the hired labor costs by the insurance rate. A few yards reported they carried no compensation insurance.

Fire insurance costs were obtained by applying the insurance rate to the insured value of the property; if it were a three-year policy, one third was taken as representative of the annual cost. Few dry-yards reported carrying no fire insurance.

General expense was arbitrarily calculated at five per cent of the labor, material, and equipment cost except for one record for which complete cost accounts were kept. This procedure was followed because in a study such as this it is impossible to obtain all of the costs of drying unless the dry-yard operator keeps a complete set of cost accounts. The few detailed accounts available for analysis indicate that telephone, interest on short-term borrowing, auto expense in soliciting workers, and other similar costs averaged about five per cent of the labor, material and equipment costs.

The straight-line method of calculating depreciation was used in all cases. The operator was asked to give the original cost and his estimate of the total length of life of the following equipment: cutting sheds, sulfur houses, trays, boxes, tracks, cars, and miscellaneous equipment. The rate at which some of these items depreciate depends to a considerable degree upon the kind of treatment the dry-yard operator gives them. For example, trays, if carefully repaired and protected from the weather may last thirty or forty years; if handled roughly and discarded when broken, they may last only five years. Instead of applying a constant depreciation rate to equipment regardless of treatment received, the operator's estimate of probable length of life was used.

Interest on the average investment was considered a cost because the funds tied up in drying equipment could be invested elsewhere and bring in an interest return. An interest rate of five per cent was used. The average investment in drying equipment in each dry-yard was calculated by adding to the cost of the land one half of the original cost of all the other items. This procedure is based on the premise that, for any large group of dry-yards, there will be some new equipment and some very old equipment, and that on the average, the equipment will be worth

about half its original cost. The premise was tested with the data from 80 dry-yards, and it was found that the average value of drying facilities obtained by this method of calculation was $13.67 per fresh ton of fruit dried. On the same 80 dry-yards the depreciated or "book" value of drying facilities was $12.67 per fresh ton of fruit dried. Use of the latter figure would have lowered the cost of drying by only five cents per fresh ton.

It should be reiterated here that any costs in connection with items of equipment which were used for more than one kind of fruit were allocated among the different fruits dried. In the majority of cases, the allocation was on the basis of tons of fresh fruit dried. In a few cases, an arbitrary allocation was made based on the operator's description of the respective uses made of the equipment.

A somewhat different classification was necessary on the pear records. It was not possible on these records to separate the labor of repair, maintenance and washing from the regular shed and yard work. A separate item of supervision is shown. This includes only the portion of the manager's salary allocated to the dry-yard. Some supervisory labor was paid for by the hour and this cost is shown under shed and yard work. The dehydrator expense item was due to the fact that three of the dry-yards had to finish their fruit in dehydrators because of the late season and the cool weather. General expense for three of the dry-yards was taken from published statements and includes such items as taxes, telephone and telegraph, light and power, office supplies, tractor expense, office expense, director's expenses, and other items of a like nature. To have separated these would have involved a complete audit of the books of these firms. For the fourth yard, general expense was taken as five per cent of labor, material, and equipment cost, plus tractor and county tax costs. The resultant per ton cost fell within the range of general expense costs of the other three dry-yards that had complete accounting systems. Depreciation and interest costs were obtained in the manner previously described.

It was not possible to make much of a separation of cost items in the study of apple drying costs. The eleven firms that cooperated all had somewhat different classifications under which individual expense items were placed. To have made a more detailed breakdown of costs would have required an extensive study of the books of these firms, and a reclassification of many of their expense items. The five cost items used will be described in greater detail in the discussion of tables 13, 14, and 15.

Cost of Drying Apricots

Summary of All Costs.-- The average cost to dry a ton of apricots in the 58 dry-yards studies in 1942 was $22.96 (table 3). The dry-yard with the lowest cost reported only $14.70 as the total cost per fresh ton dried while the highest cost yard reported $53.86. Much of this difference was due to variations in labor costs which ranged from $11.70 to $39.54. Some operators made a practice of sorting their fruit over very carefully before turning it over to the packer. Since family labor was charged as a cost in this study, those operators who devoted considerable time to sorting and upgrading their fruit had higher than average costs even though members of the family did the work. It was not possible in this study to make a separation of the labor cost of this farm sorting of the dried product, but it is known that this work contributed to some of these higher costs.

The range in material costs is due to the fact that some dry-yards purchased no repair material or knives, leaving only sulfur and cards as material expense items.

TABLE 3

Apricots: Summary of Dry-yard Costs per Fresh Ton and per Dried Hundredweight, Fifty-eight Dry-yards, California 1942

Cost items	Cost per fresh ton		Cost per dried hundredweight	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor:				
Maintenance and repair	0.66		0.18	
Washing trays and boxes	0.78		0.21	
Cutting	8.90		2.42	
Shed, yard and supervision	7.42		2.02	
Total labor	17.76	11.70-39.54	4.83	3.09 - 12.92
Material:				
Repair material	0.42		0.11	
Sulfur	0.36		0.10	
Cards, knives, etc.	0.14		0.04	
Total material	0.92	0.09 - 1.77	0.25	0.02 - 0.49
Other cash costs:				
Equipment	0.15		0.04	
Taxes	0.21		0.06	
Compensation insurance	0.36		0.10	
Fire insurance	0.21		0.06	
General expense *	0.74		0.20	
Total other cash costs	1.67	1.02 - 4.54	0.46	0.28 - 1.48
Depreciation	1.62	0.20 - 8.90	0.44	0.05 - 2.34
Interest on investment at 5 per cent	0.99	0.16 - 4.16	0.27	0.04 - 1.23
Total all costs	22.96	14.70-53.86	6.25	4.05 -17.59

Fresh weight, tons	3,914.95
Dried weight, hundredweight	14,396.54
Ratio, fresh to dried weight	5.44

* Calculated as being 5 per cent of the labor, material, and equipment cost except for one record for which complete cost accounts were kept.

The range in other cash costs is due in part to the range in labor costs since general expense is a percentage of this item. Compensation insurance also bears a relationship to labor costs and tends to vary with it.

The lowest depreciation and interest costs were reported for the same dry-yard. This operator dried over 300 tons of fruit with a minimum investment in facilities. The highest depreciation cost was recorded on a yard that dried a small tonnage of fruit. The operator had a considerable sum invested in drying facilities which he felt should be depreciated over a fairly short period of time. The result was a high depreciation charge per ton. The high interest charge of $4.16 per ton was on a dry-yard in Alameda County that had a particularly heavy investment in dry-yard per ton of fruit dried plus a large investment in drying facilities. Only a small tonnage of fruit was dried.

Nearly five and a half pounds of fresh apricots were required for every pound of dried fruit produced, the ratio of fresh to dried weight averaging 5.44 (table 3). The average cost per dried hundredweight was $6.25, and the range was from $4.05 to $17.59.

Total Cost per Fresh Ton.-- Of the 58 dry-yards, 41 had total costs per fresh ton of less than $25.00 (table 4). These yards dried 80 per cent of the apricots included in this study. The yards that had the lowest total costs also had the lowest labor and the lowest "all other" costs. As total cost per ton increased, both labor cost and all the other costs showed increases.

Labor Cost per Fresh Ton.-- When the dry-yards were sorted with respect to their labor costs per fresh ton of fruit dried, 44 yards had labor costs of less than $20.00 per fresh ton (table 5). These yards dried 85 per cent of the apricots covered by this survey. Costs other than labor increased with labor costs although not in the same proportion.

Income from Apricot Pits.-- The apricot grower who elects to dry all or part of his crop has some income from the sale of pits. Anyone interested in making comparisons among prices of fresh, canned, and dried apricots, should consider this fact. In the dry-yards studies, there was one ton of pits for every 19.17 tons of fresh fruit dried. The average value of the pits was $15.33 per ton, which was equal to $0.80 per ton of fresh fruit and $0.22 per hundredweight dried.

Cost of Drying by Areas.-- The total cost of drying a ton of fresh apricots varied from $21.08 in Stanislaus County to $26.62 in Alameda County. This difference, while large, was not statistically significant because of the wide variation in costs within each of the areas studied. A difference as great or greater than this could have easily occurred due to factors other than the area in which the dry-yards were located. 3/ Similar results were secured when costs of drying apricots in the various areas were related to a dried weight basis. It should be added that comparisons of apricot drying costs among areas were limited to three counties from

---

3/ Analysis of variance was used to test the statistical significance of the various differences cited in this paper. While it cannot be claimed that the assumptions underlying this technique are strictly fulfilled by the data, it was felt that some objective test of significance of differences should be employed. Otherwise, the reader would be led to endow each numerical difference with a significance it may not possess. In all comparisons mentioned in this paper, the 5 per cent point was used as the level of significance.

TABLE 4

Apricots: Distribution of Fifty-eight Dry-yards with Respect to Their Total Drying Costs per Fresh Ton of Fruit Dried, Selected Areas, California, 1942

Total cost per fresh ton	Dry-yards	Fresh weight of apricots dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
14 to 20	20	991.01	14.77	3.10	17.87
20 to 25	21	2,139.58	17.42	5.29	22.71
25 to 30	8	441.11	20.68	6.42	27.10
30 to 35	6	278.43	24.22	8.21	32.43
35 to 54	3	64.82	27.57	12.99	40.56
All dry-yards	58	3,914.95	17.76	5.20	22.96

TABLE 5

Apricots: Distribution of Fifty-eight Dry-yards with Respect to Their Labor Costs per Fresh Ton of Fruit Dried, Selected Areas, California, 1942.

Labor cost per fresh ton	Dry-yards	Fresh weight of apricots dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
11 to 14	9	233.86	12.93	3.75	16.68
14 to 17	18	1,076.78	15.50	3.73	19.23
17 to 20	17	2,021.39	17.71	5.57	23.28
20 to 23	6	179.18	21.45	7.37	28.82
23 to 26	5	343.57	23.91	7.05	30.96
26 to 40	3	70.17	29.93	7.22	37.15
All dry-yards	58	3,914.95	17.76	5.20	22.96

which the largest number of records was obtained, namely, Santa Clara, Solano, and Stanislaus counties.

Cost of Drying Freestone Peaches

Summary of All Costs.-- The average cost of drying a ton of freestone peaches in the 40 dry-yards studies in 1942 was $13.21 (table 6). Cost per fresh ton ranged from a low of $7.17 to a high of $17.74. Labor was the most important item of cost, representing over 83 per cent of the total. The range in material costs was extremely great. The low-cost yard spent only a few dollars for repair material and burned a minimum amount of sulfur. When questioned concerning the small amount of sulfur used, the operator of this yard stated that his sulfur houses were large enough so that all fruit could be held in them overnight, and he followed the practice of burning a very small amount of sulfur and leaving the fruit exposed for a long period. The yard with the highest material cost per fresh ton used paper tray liners. The cost of this paper was classified as a material cost.

The range in depreciation costs was rather wide. The lowest cost dry-yard is the same one mentioned in the discussion of apricot drying costs. The yard that had a depreciation cost of $4.45 per fresh ton used a very short period in which to depreciate equipment, particularly trays. The writer visited the yard, and from the treatment some of the trays had received, the short period seemed justified. This yard was one that had no expense for repair material.

Total Cost per Fresh Ton.-- Twenty-five of the dry-yards, representing 51 per cent of the freestone peaches included in this study, had total costs per fresh ton of less than $13.00 (table 7). The three dry-yards that fell in the highest grouping ($16.00 to $19.00 per ton) did so because of their costs other than labor. Labor costs per ton on these yards averaged a little below the labor costs in the next lower group.

Labor Cost per Fresh Ton.-- Over half of the dry-yards had labor costs per fresh ton in the one group -- $9.00 to $11.00 (table 8). These yards dried 62 per cent of the freestone peaches in the study. All other costs did not vary in the same proportion as did labor costs.

Income from Peach Pits.-- Peach pits have little commercial value. A few operators reported sales for use as fuel. Some operators used the pits as fuel in their own homes, and the others disposed of them in various ways. The income from them can be disregarded under present price relationships.

Cost of Drying by Areas.-- The 11 records from Kings, Tulare, and Fresno counties were grouped together and referred to as the records from the "Fresno Area." The 26 records from Stanislaus County were considered as representing a second area, and the other three records were excluded on the basis of constituting too small a sample to represent their respective areas. Differences in total costs per fresh ton between the Stanislaus County records and those taken in the Fresno Area were not found to be statistically significant. Similar results were secured when costs were expressed on a per dried hundredweight basis.

Cost of Drying Clingstone Peaches

Summary of All Costs.-- The average cost to dry a ton of clingstone peaches in the 14 dry-yards studied in 1942 was $17.43. The range in costs was rather narrow,

TABLE 6

Freestone Peaches: Summary of Dry-yard Costs per Fresh Ton and per Dried Hundredweight, Forty Dry-yards, Selected Areas, California, 1942.

Cost items	Cost per fresh ton		Cost per dried hundredweight	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor:				
Maintenance and repair	0.43		0.14	
Washing trays and boxes	0.55		0.18	
Cutting	4.24		1.42	
Shed, yard, and supervision	4.59		1.54	
Total labor	9.81	5.62 -12.00	3.28	1.80 - 4.30
Material:				
Repair material	0.26		0.09	
Sulfur	0.29		0.10	
Cards, knives, etc.	0.07		0.02	
Total material	0.62	0.03 - 2.38	0.21	0.01 - 0.83
Other cash costs:				
Equipment	0.07		0.03	
Taxes	0.11		0.04	
Compensation insurance	0.22		0.07	
Fire insurance	0.11		0.03	
General expense *	0.47		0.16	
Total other cash costs	0.98	0.40 - 1.65	0.33	0.13 - 0.60
Depreciation	1.26	0.20 - 4.45	0.42	0.06 - 1.72
Interest on investment at 5 per cent	0.54	0.16 - 1.33	0.18	0.05 - 0.40
Total all costs	13.21	7.17 -17.74	4.42	2.30 - 5.88

Fresh weight, tons	8,196.84
Dried weight, hundredweight	24,511.16
Ratio, fresh to dried weight	6.69

* Calculated as being 5 per cent of the labor, material, and equipment cost except for one record for which complete cost accounts were kept.

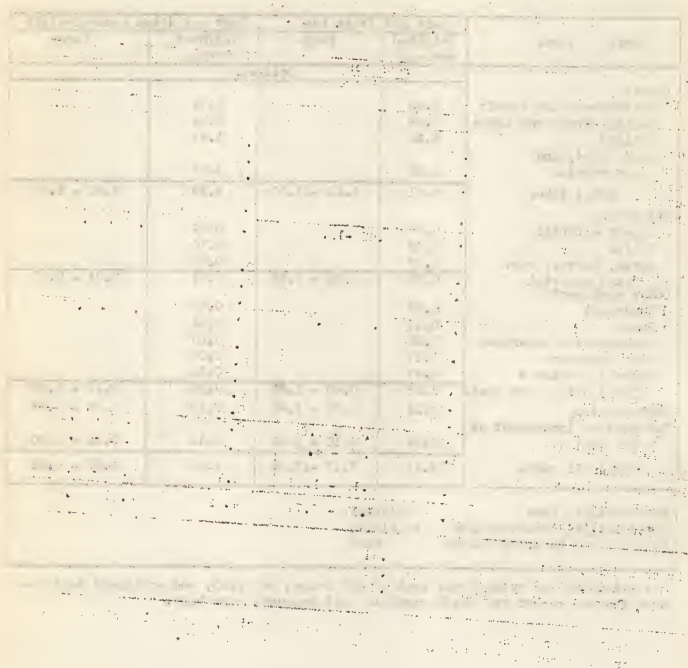


TABLE 7

Freestone Peaches: Distribution of Forty Dry-yards with Respect to Their Total Drying Costs per Fresh Ton of Fruit Dried, Selected Areas, California, 1942.

Total cost per fresh ton	Dry-yards	Fresh weight of freestone peaches, dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
7 to 10	5	776.55	7.04	1.70	8.74
10 to 13	20	3,403.75	9.40	2.62	12.02
13 to 16	12	2,818.47	10.74	3.71	14.45
16 to 19	3	1,198.07	10.55	6.04	16.59
All dry-yards	40	8,196.84	9.81	3.40	13.21

TABLE 8

Freestone Peaches: Distribution of Forty Dry-yards with Respect to Their Labor Costs per Fresh Ton of Fruit Dried, Selected Areas, California, 1942.

Labor cost per fresh ton	Dry-yards	Fresh weight of freestone peaches, dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
5 to 7	4	416.25	6.17	2.33	8.50
7 to 9	8	1,226.96	8.28	2.82	11.10
9 to 11	22	5,049.41	9.97	3.76	13.73
11 to 13	6	1,504.22	11.50	3.04	14.54
All dry-yards	40	8,196.84	9.81	3.40	13.21

the low-cost yards averaging $15.51 and the high-cost yard $19.40 per fresh ton (table 9). The higher cost of cutting the clingstone peaches largely accounts for the difference in cost between this fruit and the freestone varieties.

Total Cost per Fresh Ton.-- Five of the 14 dry-yards had average costs within the interval $17.00 to $18.00 (table 10). Variation in labor cost per fresh ton was largely responsible for the variation in total costs inasmuch as the labor item represented about 83 per cent of the total cost.

Labor Cost per Fresh Ton.-- A tabulation of the 14 dry-yards arranged by groups on the basis of their labor cost per fresh ton is presented in table 11.

Cost of Drying Bartlett Pears

Records of pear-drying costs were obtained from three dry-yards in Lake County and from one dry-yard in Alameda County. The yards in Lake County were owned and operated by three farmers' cooperative organizations and served as a means of utilizing members' fruit that was unsatisfactory for shipping or for sale to canneries. The yard in Alameda County was owned by a commercial drier who bought pears from Santa Clara County and dried them for his own account.

The average drying cost in these four dry-yards during the 1942 season was $25.30 per ton of fresh pears (table 12). The lowest cost yard reported a cost of $21.98 while the highest cost yard reported $31.80 per fresh ton. The ratio of fresh weight to dried weight was 5.20, resulting in an average cost per dried hundredweight of $6.57. Labor was the biggest item of expense, accounting for slightly more than seventy per cent of the total cost.

Cost of Drying Apples

Apples are dried by means of artificial heat in contrast to the sun-drying methods used for apricots, peaches, and pears. This fact has tended to concentrate the drying of apples within the control of a relatively few large commercial apple driers. Records of apple-drying costs were obtained from 11 operators who produced a total of 2,115 tons of dried apples. The data used in this study were supplied from the records of these eleven operators. No attempt was made by the author to audit the books of these firms. Because of the lack of uniformity in the accounting systems employed by these firms, it was possible to separate costs into only five different categories.

The average cost of drying Gravenstein Apples was $12.64 per fresh ton (table 13). For every ton of dried apples, 8.23 tons of fresh apples were required, resulting in an average cost per dried ton of $103.96. This variety was dried only in the Sebastopol area.

Labor was the most important single item of cost. This item includes all hired labor plus a charge for the operators' own time in those driers where a portion of the work was done by him. Supplies include sulfur, sodium sulfite, salt, box shook, paper, nails, sacks, and unclassified supply items. The wide range in this cost item, $0.95 to $14.16 per dried ton, is due largely to the fact that some of the operators packed apples in boxes, while others used the less expensive method of sacking them.

TABLE 9

Clingstone Peaches: Summary of Dry-yard Costs per Fresh Ton and per Dried Hundredweight, Fourteen Dry-yards, Stanislaus County, California, 1942.

Cost items	Cost per fresh ton		Cost per dried hundredweight	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor:				
Maintenance and repair	0.25		0.09	
Washing trays and boxes	0.40		0.15	
Cutting	9.04		3.29	
Shed, yard, and supervision	4.80		1.75	
Total labor	14.49	12.28-16.19	5.28	3.85 - 6.45
Material:				
Repair material	0.11		0.04	
Sulfur	0.37		0.13	
Cards, knives, etc.	*		*	
	0.48	0.15- 0.89	0.17	0.04 - 0.36
Other cash costs:				
Equipment	0.10		0.04	
Taxes	0.07		0.03	
Compensation insurance	0.34		0.13	
Fire insurance	0.03		0.01	
General expense /	0.76		0.27	
Total other cash costs	1.30	1.02- 1.92	0.48	0.29 - 0.72
Depreciation	0.82	0.34- 1.54	0.30	0.13 - 0.58
Interest on investment at 5 per cent	0.34	0.23- 0.71	0.12	0.08 - 0.26
Total all costs	17.43	15.51-19.40	6.35	4.45 - 7.89
Fresh weight, tons	1,376.73			
Dried weight, hundredweight	3,778.87			
Ratio, fresh to dried weight	7.29			

* Less than $0.005

/ Calculated as being 5 per cent of the labor, material, and equipment cost.

TABLE 10

Clingstone Peaches: Distribution of Fourteen Dry-yards with Respect to Their Total Drying Costs per Fresh Ton of Fruit Dried, Stanislaus County, California, 1942

Total cost per fresh ton	Dry-yards	Fresh weight of clingstone peaches dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
15 to 16	2	31.78	13.05	1.20	15.54
16 to 17	3	451.76	13.68	0.77	16.28
17 to 18	5	325.57	14.33	1.27	17.45
18 to 19	2	464.88	15.15	1.37	18.23
19 to 20	2	102.74	16.03	1.52	19.35
All dry-yards	14	1,376.73	14.49	1.16	17.43

TABLE 11

Clingstone Peaches: Distribution of Fourteen Dry-yards with Respect to Their Labor Costs per Fresh Ton of Fruit Dried, Stanislaus County, California, 1942.

Labor cost per fresh ton	Dry-yards	Fresh weight of clingstone peaches dried	Weighted average cost per ton		
			Labor	All other costs	All costs
Dollars	Number	Tons	Dollars		
12 to 13	2	73.32	12.83	1.24	16.39
13 to 14	4	494.35	13.79	0.82	16.36
14 to 15	4	288.48	14.48	1.63	18.00
15 to 17	4	520.58	15.40	1.20	18.27
All dry-yards	14	1,376.73	14.49	1.16	17.43

TABLE 12

Pears: Summary of Dry-yard Costs per Fresh Ton and per Dried Hundredweight, Four Dry-yards, California, 1942.

Cost items	Cost per fresh ton		Cost per dried hundredweight	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor:				
Cutting	8.87		2.30	
Shed and yard	8.34		2.17	
Supervision	0.94		0.24	
Total labor	18.15	13.64-23.32	4.71	3.25 - 5.85
Other cash costs:				
Sulfur	0.48		0.12	
Repair material	0.34		0.09	
Other material	0.27		0.07	
Tray rent	0.06		0.01	
Dehydrator expense	0.37		0.10	
Insurance	0.40		0.11	
General expense	0.78		0.20	
Total other cash costs	2.70	1.70- 4.31	0.70	0.40 - 1.09
Overhead costs:				
Depreciation	3.31	2.74- 4.29	0.86	0.66 - 1.31
Interest on investment	1.14	0.84- 2.39	0.30	0.20 - 0.57
Total overhead costs	4.45	3.58- 5.71	1.16	0.86 - 1.75
Total all costs	25.30	21.98-31.80	6.57	5.23 - 8.23

Fresh weight, tons	2,691.23
Dried weight, hundredweight	10,358.96
Ratio, fresh to dried weight	5.20

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

TABLE 13

Gravenstein Apples: Summary of Drying Costs per Fresh Ton and per Dried Ton, Six Driers, Sebastopol Area, California, 1942.

Cost items	Cost per fresh ton		Cost per dried ton	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor	8.66	7.52-11.25	71.25	52.11-87.09
Supplies	1.21	0.11- 1.71	9.97	0.95-14.16
Fuel, electricity, and water	0.99	0.83- 1.29	8.16	6.65-11.93
General expense	0.49	0.13- 0.67	4.06	0.95- 4.66
Rent, interest, and depreciation	1.29	0.42- 3.59	10.52	2.86-31.50
Total all costs	12.64	11.17-16.17	103.96	77.41-141.83
Fresh weight, tons	4,022.05			
Dried weight, tons	488.93			
Ratio, fresh to dried weight	8.23			

Fuel, electricity, and water were costs common to all of the driers. Some of them kept separate records of those items, but a few driers did not, so it was necessary to combine the three items into the one cost category.

General expense includes taxes, insurance, repair, storage, inspection, telephone, office supplies, and the other miscellaneous costs connected with the operation of the drier. Because all of the operators kept complete records, it was not necessary to approximate the general expense as was the case for the apricot and peach records.

Five of the six operators who dried Gravenstein apples rented their driers. Four paid rents based on the green tonnage of apples dried. The other paid a flat sum as rent for the entire season. Depreciation on the owner-operated drier was figured at the same rate as the operator used on his income tax return.

Two interest items were calculated. Interest on the average investment at the rate of 5 per cent was figured as a cost on all of the owner-operated driers. Interest on working capital was figured as a cost for all the driers in the study. The assumption was made that each operator would need working capital equal to one half of his expenses other than depreciation and interest and that this sum would be needed for four months. An annual interest rate of 6 per cent was used. This rate was paid by some of the operators who needed bank credit.

Only four of the six cooperating driers in the Sebastopol area dried late apples (table 14). The average cost per fresh ton was $12.36 and the average per dried ton $82.48. The low cost per dry ton was due to the low ratio of fresh to dried weight of 6.67 which was reported by these four driers. This low ratio was o due to the quality of the fruit delivered to the driers and would not prevail under ordinary conditions.

Costs per fresh ton averaged somewhat higher in the Watsonville area (table 15). The important differences were in connection with the items of supplies and general expense. Four of the five driers in this area packed out their fruit in wooden boxes for delivery to the United States Army and accordingly had the high costs associated with this type of pack. This accounts primarily for the larger supplies cost. The higher general expense item may be attributed in part to the more complete accounting systems employed by the Watsonville area firms. They were larger, and most of them employed full-time bookkeepers and were thus in a position to record properly all charges against the drier operation. Some of the smaller firms in the Sebastopol area did not have regularly employed bookkeepers, and their records, as a consequence, were not as complete.

Six of the eleven operators interviewed rented the driers that they operated. Excluding one drier that was rented on a seasonal basis, the average rental charge was $7.86 per ton of dried apples. This compares with average interest on investment and depreciation charges totaling $6.43 for the five owner-operated driers (table 16). The data on taxes and repairs on buildings and equipment were not given in sufficient detail to permit their inclusion, but it seems highly probable that these two expense items would equal or exceed the $1.43 difference shown in table 16.

Credit for Apple By-products.-- In the drying of apples, certain products of value other than the dried apple result. The cores, peelings, and small apples, can be used in making vinegar. In some cases, the small peices of dried apple, or "screenings," as they are called in the industry, can be utilized.

There is some difference of opinion in the industry as to the proper accounting procedure to be followed with regard to the money received from these products.

One group believes that this income should be credited against the cost of drying and thus serve to lower the cost. The other group believes that any income from these products should revert to the drier, and not serve to reduce the cost. Sound accounting procedure favors the former group.

Data are available from only three driers as to the exact amounts received in 1942 from the sale of these by-products. One firm received the following amounts per ton of dried apples: $5.73 for cores and peeling; $3.87 for cider apples; and $21.84 for screenings and pickouts. This amounted to a total return from these products of $31.44 per ton of dried apples. This was the only firm that stated that a return had been received from the screenings. Several other firms indicated that their screenings had been condemned as unfit for human consumption by the State Inspector. The other two driers reported that they received $7.69 and $7.04 respectively for cores and peelings per ton of dried fruit.

This matter of the value of these by-products should be investigated thoroughly. The value of the screenings in particular suggests that ways be studied for preserving their quality so that they might remain in all possible cases an edible product.

Some Factors Affecting the Cost of Drying Apricots and Peaches

This discussion is limited to apricots and peaches because of the larger number of records obtained of the costs of drying these fruits. The principles brought out here are applicable also to pears and apples.

Ratio of fresh to dried weight.-- The relation between the fresh weight of the fruit and its dried weight is extremely important to the dry-yard operator. Virtually all of his costs associated with drying bear a direct relation to the tonnage of fresh fruit handled. His income is dependent, however, upon the weight (and the quality) of the dried product.

The differences in drying ratios of either apricots or peaches among the various areas studied in 1942 were not statistically significant. However, there were significant differences among the drying ratios of the different varieties of fruit. The analysis of variance of drying ratios by varieties is reproduced for apricots in table 19 and for peaches in table 20. Of the apricot varieties, only Royal, Blenheim, and Tilton were dried in sufficient tonnage to be considered (table 17). For freestone peaches, the differences among the Elberta, Muir and Lovell varieties were tested. The Lovell variety was represented by the largest tonnage of the freestone peaches included in this study, and the Muir variety ranked second in importance (table 18). The clingstone peaches studied were not reported separately by varieties.

Average Investment per Ton.-- The average investment per ton of fruit dried has an important bearing on the drying cost per ton through its effect upon both the interest and depreciation charges. However, before examining the investment per ton, it is pertinent to consider the tonnage of fruit dried.

These 81 dry-yards dried a total of 16,333.80 tons of fruit (table 21). Freestone peaches were represented with the largest tonnage, apricots were second in importance with clingstone peaches third. In addition to these three crops, these yards also dried 889.5 tons of prunes, 523 tons of golden bleach raisins, 189.4 tons of pears, and 136.7 tons of nectarines. All weights are the fresh weight of the fruit dried.

TABLE 14

Late Apples: Summary of Drying Costs per Fresh Ton and per Dried Ton, Four Driers, Sebastopol Area, California, 1942.

Cost items	Cost per fresh ton		Cost per dried ton	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor	8.64	7.51-11.58	57.65	47.69- 85.13
Supplies	1.26	0.14- 1.60	8.45	0.95- 10.19
Fuel, electricity, and water	1.01	0.96- 1.30	6.73	6.09- 8.95
General expense	0.63	0.25- 1.06	4.16	1.75- 7.27
Rent, interest, and depreciation	0.82	0.42- 1.31	5.49	2.61- 11.18
Total all costs	12.36	11.17-15.37	82.48	70.86-118.95

Fresh weight, tons	2,271.57
Dried weight, tons	340.40
Ratio, fresh to dried weight	6.67

TABLE 15

Late Apples: Summary of Drying Costs per Fresh Ton and per Dried Ton, Five Driers, Watsonville Area, California, 1942.

Cost items	Cost per fresh ton		Cost per dried ton	
	Weighted average	Range	Weighted average	Range
	Dollars			
Labor	8.79	6.21-12.73	71.11	55.69- 93.49
Supplies	2.03	1.59- 2.83	16.43	11.59- 22.05
Fuel, electricity, and water	0.70	0.52- 1.01	5.61	4.56- 7.44
General expense	1.55	1.02- 1.79	12.54	7.53- 16.16
Rent, interest, and depreciation	1.11	0.97- 1.49	8.99	7.52- 10.84
Total all costs	14.18	11.47-17.37	114.68	102.89-127.57

Fresh weight, tons	10,399.12
Dried weight, tons	1,285.60
Ratio, fresh to dried weight	8.09

TABLE 16

Comparison of Rental Charges with Depreciation and Interest on Investment
11 Selected Apple Driers, Sebastopol and Watsonville
Areas, California, 1942.

Drier	Rent per dried ton	Depreciation and interest per dried ton
Number 1	$ 7.00	--
Number 2	7.50	--
Number 3	8.00	--
Number 4	8.00	--
Number 5	10.00	--
Number 6	30.10*	--
Number 7	--	$ 2.11
Number 8	--	6.32
Number 9	--	6.51
Number 10	--	8.71
Number 11	--	9.82
Weighted average	$ 7.86/	$ 6.43

* Drier rented on a seasonal basis. Smaller tonnage dried than was anticipated.

/ A verage does not include drier Number 6.

TABLE 17

Tonnage of Apricots Dried, by Varieties, Selected Areas, California, 1942.

Area	Fresh tons of apricots dried					
	Blenheim	Royal	Tilton	Moorpark	Variety not segregated	All varieties
Contra Costa	1,018.20	--	184.00	--	359.45	1,561.65
Solano		598.66	--	--	--	598.66
Santa Clara	553.48	--	--	12.76	--	566.24
Stanislaus	269.25	--	229.78	--	5.04	504.07
San Benito	175.41	--	--	--	240.75	416.16
Alameda	268.17	--	--	--	--	268.17
All areas	2,284.51	598.66	413.78	12.76	605.24	3,914.95

TABLE 18

Tonnage of Freestone Peaches Dried, by Varieties, Selected Areas, California, 1942.

Area	Fresh tons of peaches dried					
	Lovell	Muir	Elberta	Hale	Variety not segregated	All varieties
Stanislaus	2,851.92	1,230.97	374.35	50.18	542.22	5,049.64
Fresno	321.39	314.10	774.61	--	332.10	1,742.20
Brentwood-Winters	133.42	716.78	85.40	216.60	252.80	1,405.00
All areas	3,306.73	2,261.85	1,234.36	266.78	1,127.12	8.196.84

TABLE 19

Analysis of Variance of Drying Ratios of Apricots, by Varieties, California, 1942.

Variety	Number of records*	Average drying ratio	Variance analysis	Degrees of freedom	Variance	Variance ratio, F.	5 per cent table value of F.
Royal	12	5.38	Among varieties	2	3.55	11.65	3.16
Blenheim	38	5.49	Within varieties	58	0.31		
Tilton	11	6.35					
All varieties	61	5.63	Total	60			

* Some dry-yards dried more than one variety.

TABLE 20

Analysis of Variance of Drying Ratios of Freestone Peaches, by Varieties, California, 1942.

Variety	Number of records*	Average drying ratio	Variance analysis	Degrees of freedom	Variance	Variance ratio, F.	5 per cent table value of F.
Elberta	17	7.06	Among varieties	2	2.91	4.07	3.14
Muir	21	7.01	Within varieties	65	0.72	--	--
Lovell	30	6.44					
Total	68	6.77	Total	67			

* Some dry-yards dried more than one variety.

TABLE 21

Tonnage of All Fruit Dried, 81 Dry-yards, Selected Areas, California, 1942.

Area	Fresh weight of fruit dried							
	Apricots	Freestone peaches	Cling peaches	Pears	Nectarines	Grapes*	Prunes ⁄	Total
	Tons							
Stanislaus	657.97	5,049.64	1,416.73	--	--	--	--	7,124.34
Contra Costa	1,561.65	1,441.70	15.50	--	136.7	--	--	3,155.55
Fresno	28.25	1,770.20	--	--	--	523.0	--	2,321.45
Solano	598.66	804.30	--	20.70	--	--	121.5	1,545.16
Santa Clara	566.24	--	--	25.00	--	--	420.0	1,011.24
San Benito	416.16	--	--	--	--	--	348.0	764.16
Alameda	268.17	--	--	143.73	--	---	--	411.90
All areas	4,097.10	9,065.84	1,432.23	189.43	136.7	523.0	889.5	16,333.80

* Grapes for Golden Bleach raisins only. On some farms in Stanislaus County and in the Fresno area, the trays were used in the field for drying grapes.

⁄ Sun-dried prunes only. In some cases, the trays and other equipment were used in connection with the dehydrating of prunes.

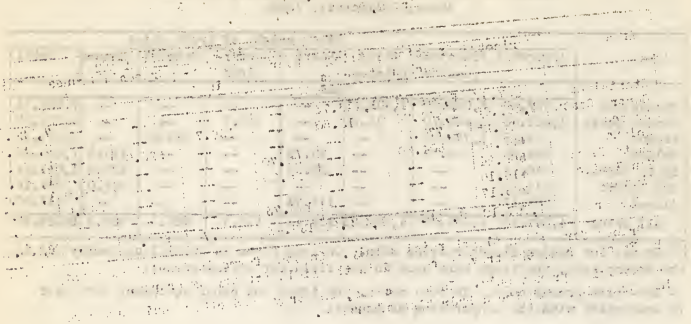
TABLE 22

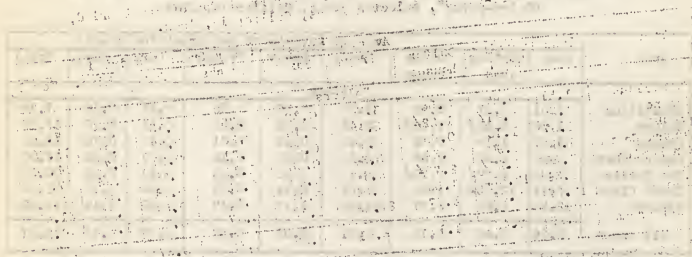
Average Investment in Drying Facilities per Fresh Ton of Fruit Dried, 80 Dry-yards*, Selected Areas, California, 1942.

Area	Average investment per fresh ton dried								
	Land	Cutting shed	Sulfur houses	Trays	Boxes	Tracks	Cars	Misc.	Total
	Dollars								
Stanislaus	1.51	0.87	0.56	3.74	0.32	0.35	0.25	0.16	7.76
Solano	1.56	2.41⁄	1.22⁄	5.45	0.49	0.25	0.22	0.15	11.75
Fresno	1.97	1.18	0.69	8.48	0.44	0.31	0.21	0.78	14.06
Contra Costa	1.66	4.90	2.34	5.34	0.88	1.14	0.71	0.93	17.90
San Benito	3.28	4.27⁄	2.70⁄	8.13	0.48	0.63	0.51	0.56	20.56
Santa Clara	6.31	12.85⁄	1.50	8.54	0.94	0.56	0.54	0.19	31.43
Alameda	12.26	2.65	3.77	24.53	1.13	0.47	0.60	1.49	46.90
All areas	2.26	2.46	1.18	5.91	0.52	0.52	0.37	0.45	13.67

* Data on investment not comparable for one dry-yard.

⁄ In determining the average investment per ton in cutting shed and sulfur house, the total average investment was divided by the tonnage of fruit other than prunes.





The average investment in drying facilities per fresh ton of fruit dried ranged from $7.76 in Stanislaus County to $46.90 in Alameda County (table 22). Considering five per cent as a fair rate of interest, these investment values give an interest charge of only $0.39 per fresh ton in Stanislaus compared with $2.34 in Alameda.

One of the principal factors associated with the average investment per ton is the total tonnage dried. There is an irreducible minimum of equipment below which the operator cannot go regardless of the tonnage dried. The eighty dry-yards were sorted into seven groups based on the tonnage of all fruit dried in each yard. Those that dried less than 50 tons per yard had an average investment of $39.34 per ton (table 23). As the tonnage dried per yard increased, the average investment per ton declined with two exceptions. One of these groups, the yards drying from 300 to 500 tons of fruit had one yard capable of drying 600 to 700 tons of fruit, but which, because of labor shortages, dried only 303 tons. As a consequence, the average investment per ton in this yard was high.

The investment per ton is also high for the largest dry-yards. This is due in part to one dry-yard that had considerable investment in expensive facilities designed to save labor and lower cash operating expenses.

The dry-yards that handled the larger tonnages of fruit did so primarily because they could dry a considerable tonnage of peaches (table 24). This fact precludes the possibility of some dry-yards increasing their tonnage dried. However, the operators of those yards that are located in areas where both apricots and peaches are grown, could reduce their overhead costs per ton by drying as large a tonnage as possible. For those who dry all their own production, contract drying and the purchase of fresh fruit are possible ways of increasing the tonnage dried.

Depreciation Rates.-- Each operator was asked to give his estimate of the probable length of life of each type of equipment used. This practice was followed because different operators subject their equipment to various kinds of treatment, with resulting variations in its useful life.

Cutting sheds were estimated to have an average life of 28 years (table 25). This life is equivalent to a percentage depreciation rate of 3.57 per cent per year. The range in estimates, 5 to 100 years is somewhat misleading, in that only three operators estimated the useful life of the cutting shed at less than 15 years and only one at more than 50 years. Most of the estimates were for 20, 25, or 30 years.

Sulfur houses were estimated as having a shorter life than cutting sheds. This was primarily because of the destructive action of the sulfur-dioxide gas. The average life was estimated at 19 years; the range from 4 to 50 years (table 25). This range is not out-of-line considering the fact that some of the sulfur houses are very lightly constructed, and designed to last only a few years, while others are of concrete or other material designed for permanence.

Trays were estimated to have an average useful life of 13 years, and boxes, 10 years (table 25). Estimates ranged from 5 to 40 years for trays and 3 to 45 years for boxes. The treatment received by these two pieces of equipment is particularly important. If they are carelessly thrown around, they soon become broken and useless.

The operators who used the large-size trays estimated the average life of their trays at 17.6 years while the operators who used the small-size trays considered they would last only 8.8 years on the average (table 26). The original cost of the three

different sizes of trays was about the same when their respective capacities are considered. The use of the shorter life on the smaller trays resulted in a proportionately higher depreciation charge on the smaller-sized trays.

The estimates of the length of life of the tracks were complicated by the fact that the steel rails used in many yards will undoubtedly outlast the wood ties. The average estimate gave this class of equipment a life of 29 years. The range, 10 to 100 years, is further complicated by the fact that a few yards had wood, or strap-iron rails, and that some had steel ties as well as steel rails.

Sulfur house cars were estimated to last 17 years. Some of these are all steel construction and will last much longer. Others have wood frames that need frequent replacement because of the action of the sulfur dioxide gas.

Miscellaneous equipment included a wide range of items and consequently the estimation of length of life covers a wide range.

Wage Rates.-- One factor which contributed to the variations in cost among individual dry-yards and among the different areas was the wage rate paid. For apricots, the wage rate for shed, yard, and supervisory work hired, ranged between $0.40 and $0.75 per hour in all the areas studied, and averaged $0.51 in San Benito County as compared with an average of $0.63 in Santa Clara County (table 27).

The operators were asked to place a value on their own labor in those cases where they worked in the dry-yard. In most cases they valued their time at a slightly higher rate than that prevailing for hired labor. This is in line with the common practice of paying hired workers five or ten cents additional per hour when they assume supervisory responsibilities.

Tests of significance of inter-area variation in wage rates and labor costs incurred in drying apricots were made. Wage rates appear to show significant variation among counties considered, but labor costs do not. It should be recalled here too, that the variation among counties in total costs of drying apricots was not statistically significant. That the difference in wage rates did not result in significant differences in costs per ton may be due to the fact that within each county there was wide variation in the amount of labor used in the individual dry-yards. Another conjecture would point to the possibility of greater efficiency in the utilization of more costly labor. Whatever the explanation, the finding reported here emphasizes the danger of assuming significant differences in either labor or total costs as a consequence of the existence of such differences in wage rates.

For freestone peaches, wage rates varied from $0.30 to $0.80 per hour for hired labor (table 28). The average rate paid hired labor in Stanislaus County was $0.62 as compared with $0.53 in the Fresno area. This difference in wage rates accounted for the fact that the cost per fresh ton for drying freestone peaches was lower in the Fresno area than in Stanislaus County.

The rates paid for cutting also varied considerably among the dry-yards studied. In order to study this variation in cutting rates it was necessary to group the dry-yards on the basis of the average weight of fresh fruit per box. For boxes containing 36 to 38 pounds of fresh apricots, from $0.15 to $0.20 w as paid (table 29). This same range in cutting rates was found for the next weight interval, 39 to 42 pounds. If we assume 50 boxes to the ton, this five-cent difference per box is equal to $2.50 per fresh ton of apricots. For individual dry-yards, the range in cutting costs per ton of fresh apricots was from $7.16 for one yard in San Benito

TABLE 23

Average Investment in Drying Facilities per Fresh Ton of Fruit Dried, by Size of Dry-yard, 1942.

Tonnage of all fruit dried per dry-yard	Average investment per fresh ton dried								
	Land	Cutting shed	Sulfur houses	Trays	Boxes	Tracks	Cars	Misc.	Total
	Dollars								
Less than 50 tons	12.84	8.28	2.05	12.96	1.42	0.60	0.90	0.29	39.34
50 to 100 tons	4.58	4.28	1.77	9.55	0.69	0.46	0.45	0.30	22.08
100 to 200 tons	2.08	1.63	1.01	6.12	0.38	0.30	0.28	0.28	12.08
200 to 300 tons	1.46	2.19	0.71	4.50	0.36	0.49	0.26	0.33	10.30
300 to 500 tons	2.63	1.15	1.07	7.98*	0.44	0.20	0.20	0.38	14.05*
500 to 1,000 tons	1.24	0.57	0.46	2.80	0.27	0.46	0.22	0.14	6.16
1,000 tons and over/	1.49	3.57	1.73	5.81	0.75	0.83	0.56	0.92	15.66
All dry-yards	2.26	2.46	1.18	5.91	0.52	0.52	0.37	0.45	13.67

* One dry-yard in this group had tray capacity far in excess of the tonnage dried.

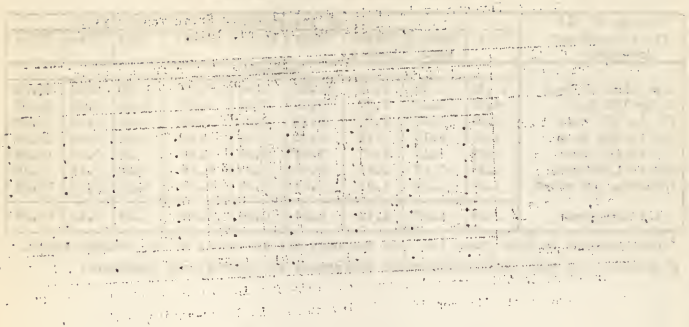
/ Includes one yard with considerable investment in labor-saving equipment.

TABLE 24

Average Tonnage of Fruit Dried per Dry-yard, 81 Dry-yards, Selected Areas, California, 1942.

Total tons fresh fruit per dry-yard	Dry-yards	Average tonnage dried per dry-yard					
		All fruit	Apricots	Freestone peaches	Cling peaches	Prunes	Other*
	Number	Tons					
Under 50 tons	16	26.04	18.49	7.30	--	0.25	--
50 to 100 tons	25	71.55	33.54	26.39	1.29	8.50	1.83
100 to 200 tons	17	146.42	31.80	79.80	12.29	22.53	--
200 to 300 tons	10	247.42	38.45	164.92	15.05	29.00	--
300 to 500 tons	5	330.90	88.49	177.34	36.32	--	28.75
500 to 1,000 tons	5	597.31	99.28	404.34	93.69	--	--
1,000 tons and over	3	1,508.03	366.23	791.73	130.17	--	219.90

* Includes pears, grapes, and nectarines.



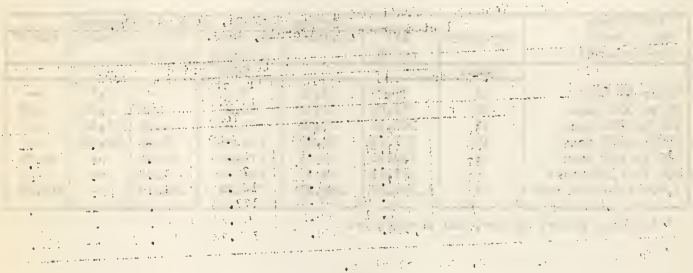


TABLE 25

Operator's Estimates of the Length of Life of Drying Equipment, 81 Dry-yards, Selected Areas, California, 1942.

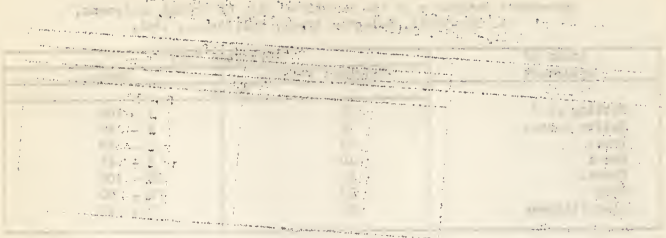
Items of equipment	Estimated life	
	Weighted average	Range
	Years	
Cutting shed	28	5 - 100
Sulfur houses	19	4 - 50
Trays	13	5 - 40
Boxes	10	3 - 45
Tracks	29	10 - 100
Cars	17	5 - 50
Miscellaneous	16	2 - 47

TABLE 26

Relation of Size of Tray to Original Cost and Length of Life, 80 Dry-yards, Selected Areas, California, 1942.

Size of tray	Trays	Original cost per tray	Estimated length of life
	Number	Dollars	Years
3 x 8 feet	117,015*	0.819	17.6
3 x 6 feet	51,072	0.609	13.1
2 x 3 feet	270,859	0.189	8.8

* Original cost not available on one dry-yard that had 800 trays.



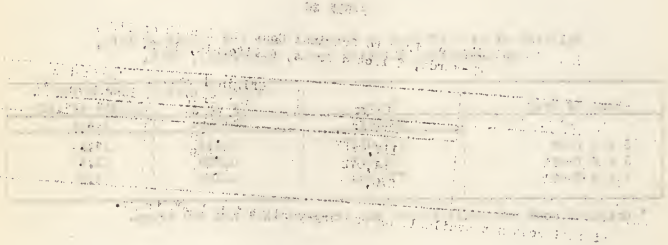


TABLE 27

Hours of Shed, Yard, and Supervisory Labor at Different Wage Rates, Apricots, Selected Areas, California, 1942.*

Rate per hour	San Benito	Alameda	Solano	Stanislaus	Santa Clara
	Hours	Hours	Hours	Hours	Hours
Hired labor:					
$0.40	--	781.5	307.5	--	140.0
0.50	4,094.2	1,536.0	1,819.5	2,169.0	462.0
0.55	259.0	--	1,924.5	773.0	--
0.60	336.5/	1,171.2	1,367.5	2,648.5	2,502.3
0.65	--	--	1,004.0	23.0	1,240.8
0.70	--	--	--	--	1,417.2
0.75	--	378.0	--	152.0	230.0
Total hours	4,689.7	3,866.7	6,423.0	5,765.5	5,992.3
Total cost	$2,390.45	$2,066.82	$3,564.32	$3,227.70	$3,759.44
Cost per hour	$ 0.51	$ 0.53	$ 0.56	$ 0.56	$ 0.63
Operator's labor:					
$0.50	267.5	--	272.0	225.0	518.0
0.55	--	--	115.0	--	--
0.60	270.0	208.0	--	408.0	88.0
0.65	--	152.0	150.0	49.0	597.0
0.70	--	--	--	--	749.5
0.75	--	320.0	125.0	162.0	30.0
0.80	--	--	--	190.0	--
Total hours	537.5	680.0	662.0	1,034.0	1,982.5
Total value	$295.75	$463.60	$390.50	$662.65	$1,247.00
Value per hour	$0.55	$0.68	$0.59	$0.64	$0.63

* Comparable data are not available for Contra Costa County.

/ Include 60 hours paid at rate of $150 per month.

TABLE 28

Hours of Shed, Yard, and Supervisory Labor at Different Wage Rates, Freestone Peaches, Selected Areas, California, 1942.*

Rate per hour	Hired labor		Operator's labor	
	Stanislaus	Fresno	Stanislaus	Fresno
	Hours			
$ 0.30	159.5	--	--	--
0.40	536.5	--	--	--
0.45	70.0	1,947.5	--	--
0.50	722.8	5,091.5/	--	500.0
0.55	1,944.0	212.0	--	--
0.60	24,681.7	2,535.9	1,417.5	60.0
0.65	834.5	911.0	324.0	--
0.70	3,166.4	185.0	150.0	--
0.75	4,368.7≠	--	910.9	--
0.80	827.7	--	--	--
0.85	--	--	--	720.0
0.875	--	--	200.0	--
Total hours	37,311.8	10,882.9	3,002.4	1,280.0
Total cost	$23,236.15	$5,779.38	$2,018.08	$898.00
Cost per hour	$ 0.62	$ 0.53	$ 0.67	$ 0.70

* Comparable data are not available for the Brentwood-Winters area.

/ Includes 130 hours paid at rate of $125.00 per month.

≠ Includes 260 hours paid at rate of $200.00 per month.

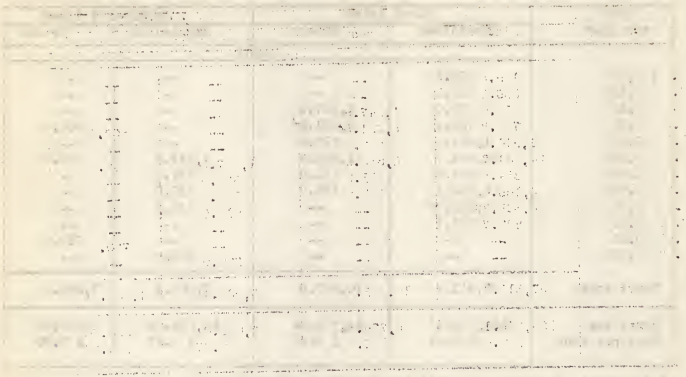


TABLE 29

Boxes of Apricots Cut at Different Rates of Pay, Selected Areas, California, 1942.

Rate per box	Pounds of fresh apricots per box				
	36 - 38	39 - 42	44 - 46	47 - 50	54 - 60
	Number of boxes cut				
$ 0.15	5,824	19,312	--	--	--
0.16	2,122	4,221	--	--	--
0.17	8,118	2,991	--	--	--
0.18	2,759	4,173	--	6,781	--
0.20	1,882	58,362	12,208	24,011	--
0.21	--	--	--	4,230	--
0.25	--	--	1,672	7,808	5,892
0.27	--	--	--	--	1,809*
0.30	--	--	--	3,434	--
0.35	--	--	--	--	571/

* Paid $0.25 per box plus $19.50 for transportation of cutters.
Paid $0.25 per box plus $55.00 for transportation of cutters.

TABLE 30

Boxes of Peaches Cut at Different Rates of Pay, Selected Areas, California, 1942.

Rate per box	Pounds of fresh peaches per box			
	36 - 38	39 - 42	43 - 45	47 - 53
	Number of boxes cut			
Freestone peaches:				
$0.055	--	--	2,480	--
0.06	--	--	--	7,719
0.07	--	--	9,010	9.473
0.075	13,213	--	--	--
0.08	--	34,599	3,459	10,148
0.09	--	48,338	10,437	--
0.10	6,326	44,140	140,995	26,809
0.14	--	--	--	6,192
Clingstone peaches:				
$0.15	1,510	--	--	--
0.16	14,914	3,349	--	--
0.18	1,735	3,564	960	433
0.20	--	18,581	21,875	--

County that paid $0.15 for cutting 42 pounds of fruit to $12.00 for a yard in Solano County that paid $0.30 per box of 50 pounds.

For peaches, both freestone and clingstone, there was also considerable variation in the prices paid per box and also in the fresh weight of fruit per box (table 30).

While average hourly wage rates, average labor costs per fresh ton, and average total costs of drying freestone peaches were lower in the Fresno area than in Stanislaus County, only the differences in wage rates and labor costs were found to be statistically significant. Thus, the significant difference in labor cost per ton did not result in a significant difference in total cost between the two areas. A possible explanation of this fact may be found in the happenstance that interest and depreciation costs per ton were higher in the Fresno area and tended to offset the lower labor costs which this area had.

Data are available showing the wage rates paid by five operators of apple driers. The average wage rates for all of the labor ranged between $0.53 and $0.70 per hour, with four driers having averages of $0.61, $0.62, $0.62, and $0.63 respectively (table 31). Persons operating the peeling machines and doing the trimmings were generally paid the lowest wages while the supervisory labor in all driers was valued at $1.00 per hour. Drier operation commanded the second highest wages in all but the Number 3 drier, whose receiver was paid $0.90 per hour.

Labor, Equipment, and Material Requirements

Any plan that contemplates the drying of a larger tonnage of cut fruit than was dried in 1942, must take into consideration the labor, equipment, and material requirements of the task.

Labor Requirements.-- Labor should be considered first. It is extremely important in the drying operation, and even in 1942 some areas reported difficulty in obtaining sufficient workers.

Two kinds of labor are used in the drying of apricots, peaches, and pears; workers who are paid by the hour and workers who are paid by the box. Considerable information was obtained from the dry-yards studied as to the number of hours worked by the first type of worker, but very little was obtained about the second. However, using the data that are available, we find that in 1942, the drying of a fresh ton of apricots required 50.43 hours, freestone peaches required 20.61 hours, and cling stone peaches, 28.85 hours (table 32). The drying of a fresh ton of pears required 29.04 hours (table 33).

Only five of the eleven apple drier operators kept a record of the hours of labor used during the 1942 season. One of these driers was converted from hand-peeling machines to power-peeling machines between the Gravenstein and the late-variety season, and separate costs kept for each season. Accordingly, in the table, the operations of this plant are treated as though there were two driers.

The three plants using power-peeling machines, required fewer hours of labor per ton of fruit dried than did the other plants (table 34). The most efficient plant equipped with hand-peeling machines required 92 hours per dry ton for the peeling and trimming operations compared with 70 hours per dry ton for this same work in the least efficient plant equipped with power-peeling machines.

TABLE 31

Average Wage Rates for Different Kinds of Work, 6 Selected Driers, Sebastopol and Watsonville Areas, California, 1942.

Nature of work	Driers					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
	Wage rate per hour					
Receiving	0.65	0.55	0.90	0.75	0.62	0.55
Peeling and trimming	0.50	0.54	0.50	0.65	0.60	0.47
Drier operation	0.80	1.00	0.76	0.95	0.71	1.00
Packing	0.60	0.50	0.70	0.75	0.59	0.50
Supervision	1.00	1.00	1.00	1.00	1.00	1.00
All work	$ 0.61	$ 0.62	$ 0.63	$ 0.70	$ 0.62	$ 0.53

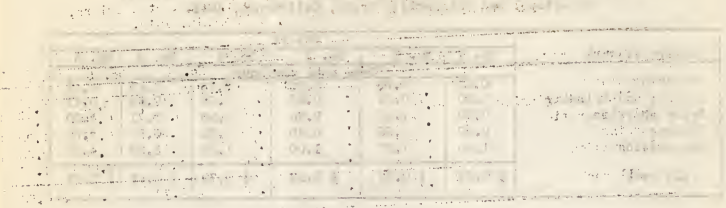
TABLE 32

Hours of Labor Required per Fresh Ton for Drying Apricots and Peaches, Selected Areas, California, 1942.

Operation	Apricots	Freestone peaches	Clingstone peaches
	Hours		
Repair and maintenance	1.21	0.76	0.46
Washing trays and boxes	1.42	1.03	0.71
Cutting	35.40*	11.33*	20.00/
Shed, yard and supervision	12.40	7.49	7.68
Total labor	50.43	20.61	28.85

* Based on records covering 519 tons of apricots and 420 tons of freestone peaches.

/ Based on estimates of dry-yard operators.



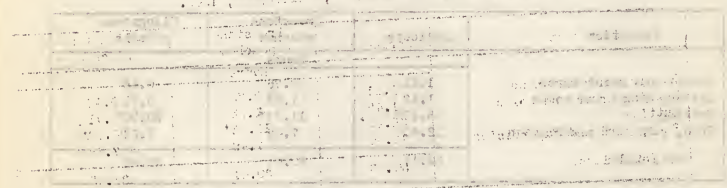


TABLE 33

Labor Requirements for Drying Pears, Selected Areas, California, 1942.

Operation	Weight of fresh pears	Total time worked	Time required per ton
	Tons	Hours	Hours
Cutting	319.37*	4,950.5	15.50
Shed, and yard work	2,691.23	33,780.0	12.55
Supervision	2,691.23	2,667.0	0.99
Total hours per ton	--	--	29.04

* Data on cutting time available from two-dry-yards for a portion of the season only.

TABLE 34

Hours of Labor Required to Dry Apples, Selected Driers, Sebastopol and Watsonville Areas, California, 1942.

Nature of work	Driers					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
	Hours					
Hours per fresh ton:						
Receiving	0.53	0.26	0.43	1.26	0.70	0.87
Peeling and trimming	6.71*	10.24*	8.22*	14.29/	11.53/	14.94/
Drier operation	2.45	1.75	3.07	1.65	1.51	1.43
Packing	2.19≠	0.54ø	2.70≠	0.56ø	2.69≠	0.80ø
Supervision	0.53	0.65	0.87	0.51	0.41	0.54
Total	12.41	13.44	15.29	18.27	16.84	18.58
Hours per dry ton:						
Receiving	3.66	1.82	3.15	9.25	5.62	7.26
Peeling and trimming	46.56*	70.33*	60.06*	104.94/	92.24/	125.11/
Drier operation	16.97	12.00	22.46	12.11	12.00	12.01
Packing	15.20≠	3.70ø	19.76≠	4.13ø	21.53≠	6.66ø
Supervision	3.66	4.50	6.34	3.73	3.30	4.50
Total	86.05	92.35	111.77	134.16	134.69	155.54

* Power-peeling machines used.
/ Hand-peeling machines used.
≠ Fruit packed in boxes.
ø Fruit packed in sacks.

Peeling and trimming required the bulk of the labor used in drying. Even in the most efficient plant, over one half of the labor was used for these operations. Considerable variation was reported in the hours of labor used for packing, depending upon the type of pack put out. The plants that packed in boxes for sale to the U. S. Army reported 15 to 22 hours per dry ton, while the plants that packed in sacks and sold to processors reported only 4 to 7 hours packing labor per dry ton.

It should be emphasized that these labor requirements are average figures. Individual workers will vary widely from these averages. This is particularly true of the workers engaged in cutting.

It is interesting to examine the speed at which different cutters work. Data are available covering the work of 89 cutters in one pear dry-yard during the week ending September 26, 1942. This was about mid-season and the yard was being used at capacity. Five cutters averaged less than 1.7 boxes per hour and earned, at $0.20 per box, only $0.30 per hour from their cutting (table 35). It was necessary for the dry-yard to pay them additional funds to make up the difference between this amount and the $0.33-1/3 an hour required as the minimum wage for experienced women by the State Industrial Welfare Commission Order No. 8a. At the other extreme there were eight cutters who averaged 4.79 boxes an hour during the week. The average of all 89 cutters was 2.88 boxes an hour, which enabled them to earn an average of $0.58 per hour. Women employed by the hour in the shed, the yard, and the adjoining packing houses were being paid from $0.55 to $0.60 an hour, so that the cutting rate of $0.20 per box was fair in comparison with the wages paid for hourly work.

Equipment Requirements.-- If any equipment shortage develops, it appears most likely that it will be a shortage of drying trays. Of the equipment used in drying, trays were the most important single item, representing 44 per cent of the average investment in drying facilities of the dry-yards studied.

Most of the trays used for apricots and peaches were one of three standard sizes; 2 x 3 feet, 3 x 6 feet, or 3 x 8 feet. One dry-yard reported using trays measuring 3 x 3-1/2 feet. The dry-yards in Lake County all reported using 2-1/2 x 8-foot trays (table 36). The small trays were most popular in the Fresno area, probably because they could also be used in drying raisin grapes. The large trays, particularly the 3 x 8-foot trays, were the most popular in Alameda, Contra Costa, San Benito, and Santa Clara counties.

The number of trays required to dry a given quantity of fruit depends upon the capacity of each tray, and upon the number of times during the season that each tray may be used.

The approximate capacities of the various sized trays as reported by the operators who dried apricots and peaches are indicated in table 37.

The number of times during the season that each tray may be used depends primarily upon the weather, both as it affects the time of drying and the length of the harvest period. Data from a number of the operators indicate that trays can be used during the season about one and one half times 4/ for apricots and about twice for peaches. These figures were used in calculating the approximate drying capacity of

---

4/ By this statement "one and one half times" is meant the use of all the trays once and the use of half of the trays a second time during the season.

TABLE 35

Number of Boxes of Bartlett Pears Cut per Hour and Amounts Earned by 89 Cutters During the Week Ending September 26, 1942, Lake County, California

Average number of boxes cut per hour	Cutters	Hours worked	Boxes cut	Hours per worker	Boxes cut per hour	Earnings per hour*	Earnings for the week/
	Number					Dollars	
Less than 1.7 boxes	5	163.5	248	32.7	1.52	0.30	9.81
1.7 to 2.2 boxes	14	480.0	930	34.3	1.94	0.39	13.38
2.2 to 2.7 boxes	16	688.0	1,663	43.0	2.42	0.48	20.64
2.7 to 3.2 boxes	22	833.0	2,378	37.9	2.85	0.57	21.60
3.2 to 3.7 boxes	21	882.5	2,975	42.0	3.37	0.67	28.14
3.7 to 4.2 boxes	3	129.0	503	43.0	3.90	0.78	33.54
4.2 boxes and over	8	241.5	1,157	30.2	4.79	0.96	28.99
Totals for the week	89	3,417.5	9,854	38.4	2.88	0.58	22.27

* Based on the piece rate of $0.20 per box.
/ Based on the hours worked multiplied by the calculated earnings per hour.

TABLE 36

Tray Equipment, 84 Dry-yards, Selected Areas, California, 1942.

Area	Dry-yards	Trays				
		2'x3'	3'x6'	3'x3½'	3'x3¼'	2¼'x8'
	Number					
Alameda	4	--	1,000	20,600	--	--
Contra Costa	4	--	--	45,850	--	--
Fresno	11	168,000	5,850	2,600	--	--
San Benito	6	--	--	13,550	--	--
Santa Clara	18	--	--	22,190	--	--
Solano	12	39,000	9,428	--	1,750	--
Stanislaus	26	97,259	46,800	14,325	--	--
Lake	3	--	--	--	--	44,500
Total	84	304,259	63,078	119,115	1,750	44,500

TABLE 37

Pounds of Fruit per Tray Reported by 81 Dry-yard Operators, Selected Areas, California, 1942.

Size of tray	Apricots		Peaches	
	Yards reporting*	Fruit per tray	Yards Reporting*	Fruit per tray
	Number	Pounds	Number	Pounds
2 x 3 feet	10	12	21	17
3 x 6 feet	8	40	12	58
3 x 8 feet	31	55	7	80
3 x 3½ feet	1	21	--	30/

* Some yards dried both apricots and peaches.

/ Calculated by the author.

TABLE 38

Calculated Tray Capacity in Relation to Tonnage of Apricots Dried, 81 Dry-yards, Selected Areas, California, 1942.

Area	Calculated tray capacity of all yards	Fresh weight of apricots dried	Proportion of capacity used	Calculated tray capacity of yards drying apricots*	Fresh weight of apricots dried	Proportion of capacity used
	Tons		Per cent	Tons		Per cent
Solano	661	599	90.6	661	599	90.6
Contra Costa	1,891	1,562	82.6	1,891	1,562	82.6
San Benito	559	416	74.4	559	416	74.4
Santa Clara	915	566	61.9	915	566	61.9
Alameda	880	268	30.5	880	268	30.5
Stanislaus	2,870	658	22.9	1,660	658	39.6
Fresno	1,795	28	1.6	258	28	10.9
Total	9,571	4,097	42.8	6,224	4,097	65.8

* Number of trays multiplied by 1½ and this product multiplied by the pounds of apricots per tray reported in table 37.

the 81 dry-yards included in this study that dried apricots or peaches. This calculation gives an indication of the extent to which the trays were used at their full capacity. 5/

The calculated apricot capacity of the dry-yards in Solano County was 661 tons. In these yards, 599 tons of apricots were dried or, on this basis, the yards were used an average of 90.6 per cent of capacity (table 38). Some yards in Stanislaus County and in the Fresno area did not dry apricots so the calculated capacity of the yards that did dry this fruit are presented as well as the calculated capacity of all yards.

The calculated freestone peach capacity of all the dry-yards studied is presented in table 39. The Stanislaus County yards were used to 91.6 per cent of their calculated capacity.

The calculated capacities for drying freestone peaches of the Santa Clara, Alameda and San Benito yards are shown even though no peaches were dried in these yards. In 1942, apricots were trucked from Brentwood and from San Joaquin Valley points to the Santa Clara Valley for drying. It may be necessary to truck freestone peaches to these apricot areas if the entire freestone crop is to be dried.

It should be pointed out that these farms dried only a little more than one half of the apricots and peaches they produced (table 40). Even if labor were available, the present tray equipment would have to be augmented if a much larger tonnage were to be dried.

It has been suggested at various times that paper tray liners be used. The advocates of this plan claim the trays will not need washing and that when the fruit is partly dried, several paper tray liners can be transferred to one wooden tray and several wooden trays thus released sooner than would otherwise be the case. Of the 81 dry-yards studied, paper tray liners were used in only one. The operator reported that the paper stuck to the individual pieces of fruit and had to be very laboriously removed by hand. This characteristic of paper should be investigated thoroughly before paper tray liners are recommended to growers as a means of alleviating their tray shortages.

The equipment other than trays appears to be adequate in most cases. The amount of land set aside for dry-yard purposes may be too small on some farms, but it can be augmented by spreading trays on ditch banks, in young orchards, and on other open spaces. These practices, if extensively followed, however, will require more labor. If the cutting-shed facilities are inadequate, the cutting can be performed in the open. The cutters should be protected from the sun, either by placing the cutting tables under shade trees, or by the erection of some type of sun-shade.

Sulfur-house facilities can be made to serve a larger tonnage of apricots and peaches by cutting down the length of time each car is in a sulfur house. Many operators follow the practice of leaving the fruit in the sulfur house overnight. An exposure to the sulfur fumes of three hours for apricots and four hours for peaches is recommended. 6/

5/ If in any given area, the season is such that these factors, one and one half for apricots or two for freestone peaches, do not express accurately the number of times that the trays can be used in drying these fruits, other factors can be substituted.

6/ Long, J.D., E.M. Mrak, and C.D. Fisher. Investigations in the sulfuring of fruits for drying. University of California, Agr. Exp. Sta. Bul. 636. p.27. July, 1940.

TABLE 39

Calculated Tray Capacity in Relation to Tonnage of Freestone Peaches Dried, 81 Dry-yards, Selected Areas, California, 1942.

Area	Calculated capacity of all yards*	Fresh weight of freestone peaches dried	Proportion of capacity used	Calculated capacity of yards drying peaches*	Fresh weight of freestone peaches dried	Proportion of capacity used
	Tons		Per cent	Tons		Per cent
Stanislaus	5,514	5,050	91.6	5,514	5,050	91.6
Solano	1,262	804	63.7	989	804	81.3
Fresno	3,403	1,770	52.0	3,403	1,770	52.0
Contra Costa	3,668	1,442	39.3	3,528	1,442	40.8
Santa Clara	1,775	0	0.0	--	0	--
Alameda	1,706	0	0.0	--	0	--
San Benito	1,084	0	0.0	--	0	--
Total	18,412	9,066	49.2	13,434	9,066	67.5

* Number of trays multiplied by 2 and the product multiplied by the pounds of peaches reported in table 35.

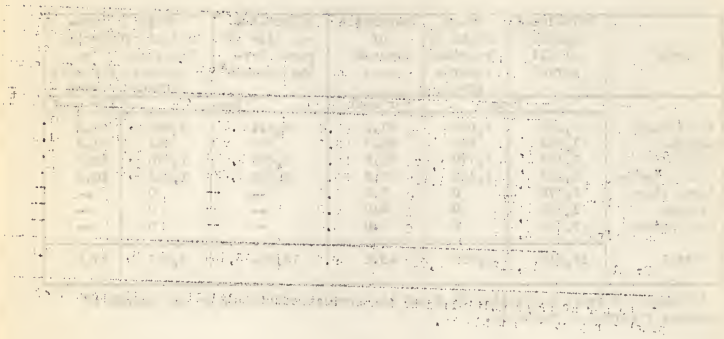


TABLE 40

Utilization of Apricots and Peaches on Farms Included in Study, Selected Areas, California, 1942.

Crop	Farms reporting	Total production	Proportion		
			Consumed fresh	Sold to canneries	Dried
	Number	Tons	Per cent		
Apricots	64	6,366.3	19.8	26.5	53.7
Freestone peaches	46	13,070.9	20.3	25.9	53.8
Clingstone peaches	12	3,982.6	0.0	88.2	11.8

TABLE 41

Sulfur Used per Ton of Apricots and Peaches, 81 Dry-yards, Selected Areas, California, 1942.

Crop	Fresh weight of fruit dried	Sulfur used per ton of fresh fruit	Cost of sulfur per 100 pounds
	Tons	Pounds	Dollars
Apricots	3,914.95	9.01	3.95
Freestone peaches	8,196.84	7.67	3.75
Clingstone peaches	1,376.73	9.91	3.73

A shortage of trucks and cars may be encountered in drying a greatly increased tonnage. It may be necessary to spread trays from trucks rather than using the conventional truck-and-car method in order to alleviate this shortage.

Material Requirements.-- Sulfur is the only material used for which quantitative data are available. The dry-yards studied used 9.01 pounds of sulfur per fresh ton of apricots, 7.67 pounds per fresh ton of freestone peaches, and 9.91 pounds per fresh ton of clingstone peaches (table 41).

Repair material, principally tray shook and nails, will be required to keep present equipment in usable shape. It is difficult to estimate the quantity required because the demands of individual dry-yards vary markedly.